



1075942 - R8 SDMS

LeCours, Catherine

From: Hoogerheide.Roger@epamail.epa.gov
Sent: Friday, January 26, 2007 8:43 AM
To: LeCours, Catherine
Subject: Fw: Comments on Troy Tape
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Attachments: Draft Final Troy SAP (4-14-06) AM edits.doc

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To: hoogerheide.roger@epa.gov
From: Aubrey Miller/EPR/R8/USEPA/US
Date: 01/21/2007 11:02PM
cc: goldade.mary@epa.gov, obrien.wendy@epa.gov, luey.jim@epa.gov
Subject: Comments on Troy Tape

Roger,

I have attached comments on the Troy Tape SAP (yellow highlights for edits, green highlights for discussion/suggestions). I do not have a copy of the Appendix E Interview Form can you email a copy to review thanks.... Aubrey

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"We can't solve problems by using the same kind of thinking we used when we created them"... A

1.0 PROJECT DESCRIPTION AND BACKGROUND

Tetra Tech EM Inc. (Tetra Tech) received Task Order No. 41 from the Montana Department of Environmental Quality, Remediation Division (DEQ), under DEQ Contract No. 402014. The purpose of this task order is to complete a Troy Asbestos Property Evaluation (TAPE) Work Plan for the Troy Operable Unit (OU) of the Libby Asbestos Superfund Site. The United States Environmental Protection Agency (EPA) is the lead agency for the Libby Asbestos Superfund Site. DEQ is the lead agency for the Troy OU through a Cooperative Agreement with EPA. EPA requested DEQ lead the Troy OU for efficient resource allocation. The TAPE Work Plan describes the field and property inspections and sample collection necessary to identify if and where asbestos is present within the Troy OU and the concentrations and quantity, if present. This information will be used at a later date to support cleanup decisions.

This TAPE Work Plan document is a combined field sampling plan and quality assurance project plan and is referred to as the TAPE Work Plan. Tables and figures in this document follow the first reference in the text. Appendix A contains the site-specific health and safety plan (HASP), Appendix B contains copies of project-applicable standard operating procedures (SOPs), Appendix C is a list of equipment and supplies required for the project, Appendix D contains samples of information for residents, and Appendix E contains example TAPE project field forms.

1.1 PROJECT BACKGROUND AND PURPOSE FOR SAMPLING

Troy, Montana, is located 18 miles northwest of Libby, Montana. From the 1920s until 1990, an active vermiculite mine and associated processing operations were located at Libby. While it was in operation, the vermiculite mine in Libby may have produced 80 percent of the world's supply of vermiculite (EPA 2005). Vermiculite is used primarily for insulation in buildings and as a soil amendment. The Libby vermiculite deposit is contaminated with amphibole asbestos. For decades, the processing of vermiculite ore and generation and disposal of waste materials resulted in widespread asbestos contamination of the Libby community. In 1999, EPA Region 8 dispatched an emergency response team to investigate media reports of asbestos contamination and high rates of asbestos-related disease in Libby. Subsequent environmental investigations have found many areas in and around Libby contaminated with LA.

The health effects from airborne exposure to the more common commercially used or encountered asbestos mineral forms (chrysotile, tremolite, actinolite, anthophyllite, amosite, crocidolite) include: (1) pleural disease (plaques, diffuse thickening, calcifications, and pleural effusions), (2) interstitial disease (asbestosis), (3) lung cancer, and (4) mesothelioma (a rare cancer of mesothelial cells in the pleura or peritoneum). The observed health effects associated with exposure to asbestiform amphibole fibers (Libby Amphibole) (Meeker, 2003) at the Libby site have been well documented and are clearly consistent illnesses seen with the more common asbestos mineral exposures (as noted below).

Studies performed in the early 1980's by researchers from McGill University (McDonald 1986a-b) and the Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH) (Amandus 1987a-c) found that former employees of the Libby vermiculite mine had significantly increased pulmonary morbidity and mortality from asbestosis and lung malignancies. Researchers at NIOSH who studied the annual chest x-rays of mine and mill workers with at least 5 years tenure (between 1975 and 1982) also found an increased prevalence of the radiographic abnormalities associated with asbestos-related disease. A recent follow-up study of Libby vermiculite workers that were previously evaluated in the 1980's, found that "this small cohort of vermiculite miners, exposed to amphibole fibers in the tremolite series, has suffered severely from both malignant and non-malignant respiratory disease"(McDonald, 2002). The overall proportionate mortality among the group for mesothelioma (4.2%) was extremely high, being similar to that seen for crocidolite (considered by many to be the most toxic form of asbestos) miners in South Africa (4.7%) and Australia (3.9%) (McDonald 2002; McDonald 2004). For comparison, the age-adjusted incidence of mesothelioma in the United States (1992-2002) was about 0.001% (1 case per 100,000) with the occurrence of cases being extremely rare prior to age 50 (SEER, 2005).

More recent studies completed at the Libby site have also found increased mortality and morbidity among former workers, as well as, others in the community without any direct occupational exposures to the mine or processing activities. A mortality study conducted by investigators from the CDC, Agency for Toxic Substances and Disease Registry (ATSDR) found markedly elevated death rates of asbestosis, lung cancer, and mesothelioma for the Libby Community for the 20-year period examined (1979–1998). Mortality from asbestosis was approximately 40 times higher than the rest of Montana and 60 times higher than the rest of the United States (ATSDR 2000, ATSDR 2002a).

Large-scale medical screening of over 7300 individuals that worked or lived in Libby for at least six months prior to 1990, found significantly increased rates of asbestos-related radiologic abnormalities. Approximately 18% (1186/6668) of the participants with asbestos-related pleural abnormalities were identified by at least 2 out of 3 B-readers. The prevalence of pleural abnormalities increased with increasing exposure pathways, ranging from 6.7% for those who were not able to identify any specific exposure pathways aside from living in Libby to 34.6% for those who reported 12 or more specific exposure pathways. The majority of individuals (>70%) with pleural abnormalities did not directly work for the mine or processing operations, or with any secondary contractors for the mine (Peipins 2003).

~~Originally believed to be a problem limited to the mine workers, the scope increased.~~ EPA began Time Critical Removal Actions in Libby in 1999 through a two-phased approach. The Phase I investigation was used to determine if a time critical removal action was warranted in Libby to protect human health, to identify potential major source areas, and to identify the appropriate analytical methods for measuring concentrations of LA in those source materials (CDM 2002). The Phase II investigation was used to collect detailed information about airborne concentrations in air that result from sources of contamination that are disturbed (CDM 2003b). The combined results from the Phase I and II investigation include:

- Exposure to LA is a threat to human health.
- Release of respirable LA fibers occurs when source materials are disturbed.

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- Source materials include vermiculite insulation, vermiculite products (building materials) and process wastes, and contaminated soils.
- Contaminated indoor dust found in residential and commercial properties is a potential exposure pathway.
- There is widespread presence of LA throughout the Libby area.

As a result of the findings from the Phase I and II investigations, and because the Libby Asbestos Superfund Site was listed on the National Priorities List in 2002, EPA further investigated residences and businesses in the Libby study area boundary (EPA 2003b). EPA began the Libby Asbestos Superfund Site Contaminant Screening Study, which was considered the first part of the Remedial Investigation, in 2002. The ongoing objective of the Contaminant Screening Study is to obtain information concerning the presence and nature of LA contamination at properties in Libby (CDM 2003a). As of December 2005, EPA and their contractors have investigated 4,029 [update figures] properties in the Libby area through the Contaminant Screening Study.

The purpose of the TAPE is identical to that of the Contaminant Screening Study. It is believed that nature of LA contamination, and associated exposure pathways present in Troy are similar to those observed in Libby. For instance, preliminary investigations have indicated similarities in the vermiculite insulation present in Troy to that found in Libby (USGS 2005). The draft Troy Conceptual Site Model (CSM) (Section 1.2) illustrates that potential exposures in Troy are similar to those in Libby, therefore, a systematic screening of Troy area residences and business is necessary to gather sufficient information to determine how many Troy area properties are contaminated with LA. Some vermiculite mine workers lived in Troy and commuted to the mine to work each day. The mine workers were exposed to asbestos-contaminated materials at the mine and processing facilities, and they transported asbestos-contaminated dust to their homes on clothes and equipment. Residents of Troy also traveled to Libby for everyday activities such as shopping, working (other than at the mine), and attending school sporting events and likely came in contact with LA in Libby during these frequent visits. In addition, the asbestos-contaminated vermiculite ore and waste materials in varying forms may have been used for amending soils (as fill or as a conditioner), building materials (plaster, concrete, or chinking amendment), and for insulating buildings in and around Troy. [What about transportation corridors (railroads, roads) through Troy, did folks burn contaminated wood ?, contaminated cars, other ?]

1.2 CONCEPTUAL SITE MODEL

Airborne exposure to asbestos is the main exposure route of concern resulting in malignant and non-malignant respiratory diseases. Oral ingestion of asbestos in environmental settings may also be a potential route of exposure and concern. ~~human health concern because chronic inhalation of excessive levels of asbestos fibers suspended in air can result in lung diseases such as asbestosis and mesothelioma.~~ The relationship between asbestos exposure and mesothelioma has been documented, and at least 70 percent of people with mesothelioma report that they have been exposed to asbestos (National Cancer Institute 2005). Figure 1-1 presents a draft Site Conceptual Model for Troy, which identifies exposure pathways by which asbestos fibers from the Libby mine might be inhaled or ingested by humans. [I recommend modifying the current Troy to be more consistent with the Libby CSM. Modifications should include how fibers/contamination got to Troy (as noted above) and any other pathways that may be specific to Troy. Any pathways specific to the Libby CSM that may not be relevant for Troy should be removed. You will also need to clearly define the geographic boundaries of the Troy OU] The draft CSM will be refined as additional data are acquired and the understanding of actual transport and exposure pathways for Troy is improved. EPA, CDM, and the Montana Department of Public Health and Human Services (Montana DPHHS) have provided additional related background information for the Libby asbestos project and on mesothelioma in Montana. [I don't understand the relevance of this unless the data will be used to evaluate other geographic locations?] (CDM 2003; Montana DPHHS 2005).

1.3 TROY SITE INFORMATION

The Troy OU is located along the Kootenai River valley at an elevation ranging from 1,850 feet above mean sea level (amsl) at the northern end of the OU to 2,500 feet amsl on the mountain slopes surrounding the valley. The Troy OU is approximately 8 miles long and up to 1.8 miles wide. Topography of the Troy OU consists of relatively flat river valley terraces on both sides of a gently graded Kootenai River. Several tributaries flow into the Kootenai River along the 8-mile stretch contained within the Troy OU. Figure 1-2 provides a topographic view of the Troy OU boundaries.

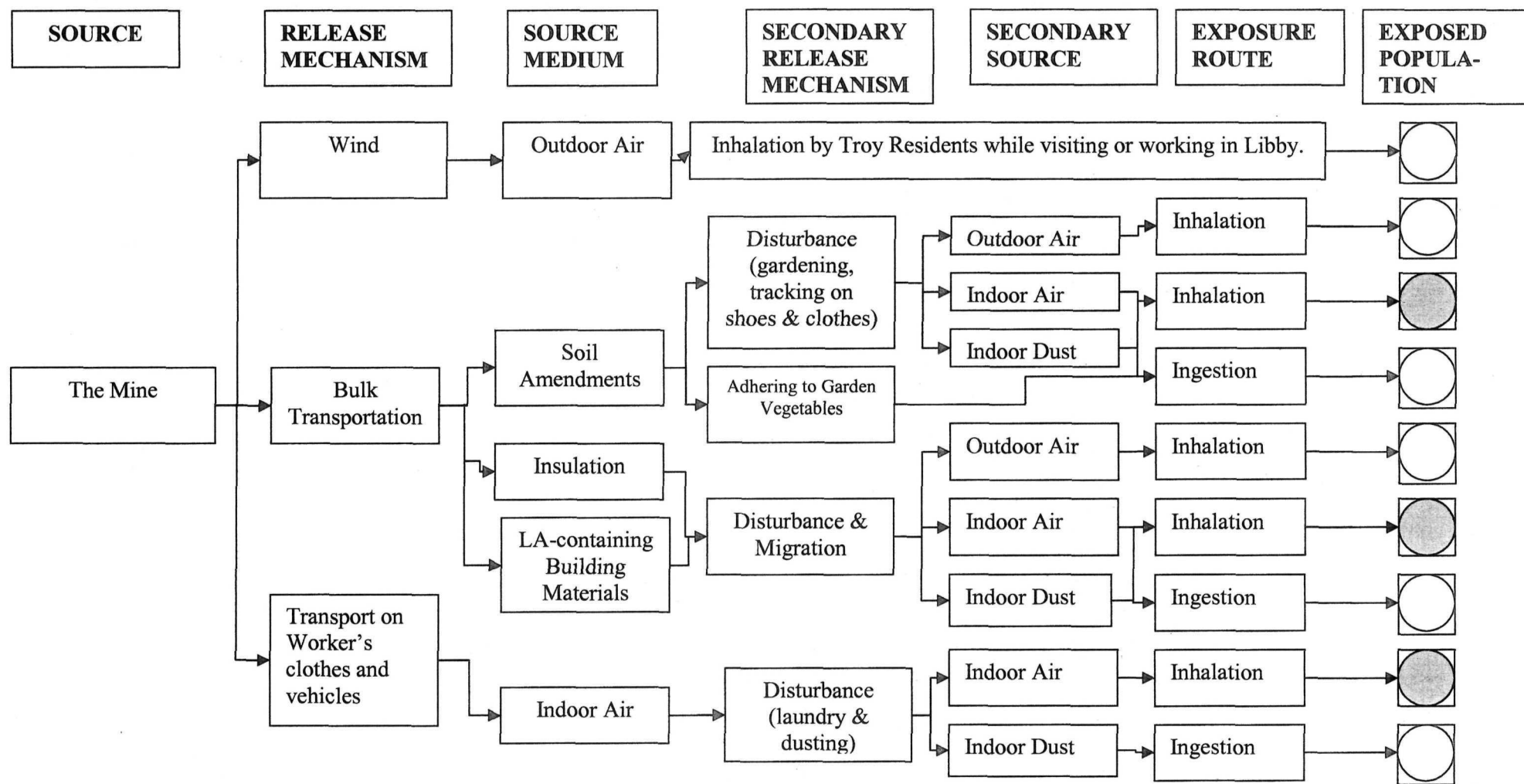


Figure 1-1: Conceptual Site Model – Potential Human Exposure Pathways to Asbestos at the Troy Operable Unit, Libby MT Superfund Site (suggest modifying new Libby CSM; see comments above)

- Pathway is complete and could be significant, quantitative evaluation required.
- Pathway is complete, but minor, qualitative evaluation required, or pathway is incomplete.

however, the Tetra Tech field team will not interpret results or make conclusions from the inspection and sampling for the property owner.

If Tetra Tech obtains soil or dust samples at a property, Tetra Tech will, if requested, provide the property owner with a receipt for the samples identifying the number and types of samples collected before the field crew leaves the property. No sample results will be available during the TAPE inspection and sampling. An individual property owner who requests a portion of a sample must supply all necessary materials required for sampling, as well as arrange and pay for laboratory analysis of all additional samples collected.

2.3 SPECIAL TRAINING AND CERTIFICATES

Tetra Tech personnel who work on the TAPE project will have met the Occupational Safety and Health Administration (OSHA) training requirements defined in Title 29 Code of Federal Regulations (29 CFR) Part 1910.120(e) for working on hazardous waste sites. These requirements include: (1) 40 hours of formal off-site instruction; (2) a minimum of 3 days of actual on-site field experience under the supervision of a trained and experienced field supervisor; and (3) 8 hours of annual refresher training. In addition, all Tetra Tech personnel working on the TAPE project will have taken the Asbestos Hazard Emergency Response Act (AHERA) 24-hour asbestos inspector training course and will hold a current asbestos inspector license issued by the State of Montana. (Suggest EPA provide some additional site-specific training regarding the amphibole asbestos found in Libby and the health effects associated with exposure)

Tetra Tech personnel working on the TAPE project must read and abide by the stipulations and guidelines set forth in Tetra Tech's HASP, which is Appendix A to this TAPE Work Plan. The HASP provides written instructions for health and safety training requirements, personal protective equipment (PPE) requirements, spill containment program, and health-hazard monitoring procedures and techniques. At least one member of every Tetra Tech field team will maintain current certification in the American Red Cross "Multimedia First Aid" and "Cardiopulmonary Resuscitation (CPR) Modular" or equivalent.

Copies of Tetra Tech's health and safety training records, including course completion certifications for the initial and refresher health and safety training, specialized AHERA training, and first aid and CPR training, are maintained in the Helena Tetra Tech office files for all TAPE field team members.

TABLE 3-1

**DATA QUALITY OBJECTIVES
INVESTIGATION OF TROY OPERABLE UNIT**

STEP 1: State the Problem

Section 1.0 of this Work Plan summarizes the history of the Libby Asbestos Superfund Site, identifies the key players and decision makers, illustrates the Site Conceptual Model, provides justification for the investigation and screening for the Troy OU, and identifies the schedule, budget, and necessary resources.

The following are problem statements associated with the Troy Properties investigation:

- Exposure to LA-contaminated vermiculite is a threat to human health (EPA 2000c).
- Respirable LA asbestos is released when source materials are disturbed (EPA 2000c).
- Potential source materials include VCI, LA-containing building materials, vermiculite waste products, and soils contaminated with LA, and household dust.
- All contaminated source materials (e.g., household dust, contaminated soils etc.) can potentially contribute to exposure pathways.
- It is believed that LA-contaminated materials may be found randomly in and around Troy in association with various activities (e.g., workers clothes, placement in gardens, contamination of transportation corridors etc.) since vermiculite mining began in Libby.
- All properties within the Troy OU should be evaluated for sources of LA contamination.

STEP 2: Identify the Decisions

Principle Discussion Question: Do sources of LA contamination exist at properties within the Troy OU?

Property Identification Decisions:

- Identify the potential properties to investigate.
- Identify the number of buildings on each property.
- Identify the number of specific use areas, yards, and open space areas on each property.

Sampling Decisions:

Inspect properties within the Troy OU to visually and analytically confirm the presence or absence of LA contamination in attics, other interior building spaces, and exterior areas, and the concentrations of LA if present.

- How will visual identification of LA in interior and exterior areas be conducted ?
- Where will interior dust samples be collected?
- Where will building material samples be collected?
- Where will exterior soil samples be collected?

TABLE 3-1 (continued)
DATA QUALITY OBJECTIVES
INVESTIGATION OF TROY OPERABLE UNIT

STEP 3: Identify Inputs to the Decisions
<p>For each property, inputs to the decision include:</p> <ul style="list-style-type: none"> • Review of aerial photographs to define individual properties, compile addresses, and determine if the property could be individually bought or sold. • Visual inspections of property to determine location and number of buildings, specific exterior use areas, and interior areas (e.g., living spaces, and attics). • Documented visible VCI in attics. • Documented visible VCI and other LA-containing building materials in interior building spaces (including but not limited to walls, crawl spaces, etc.). • Documented visible vermiculite in special use areas, yards, or open space areas. • Interviews with residents, owners, occupants, and employees • Analytical results from samples collected at each property to determine if LA is present and the concentration of the contamination if possible.
STEP 4: Define Study Boundaries
<ul style="list-style-type: none"> • The Troy OU generally consists of the valley bottom from the north half of Section 25, Township 31 North, Range 34 West, and Section 30, Township 31 North, Range 33 West, east to the junction of Highways 56 and 2, and north to the northern edge of Section 21, Township 32 North, Range 34 West. Figure 1-2 shows the configuration of the study area for the Troy OU. • Some properties (approximately 25) within the Troy OU have previously been inspected and sampled under the Libby OU4 investigation. Data have been recorded in the Libby database for these properties and will be integrated with additional sampling data from the TAPE.

TABLE 3-1 (continued)
DATA QUALITY OBJECTIVES
INVESTIGATION OF TROY PROPERTIES

STEP 5: Develop Decision Rules

The Record of Decision for the Troy OU will identify the specific parameters, conditions, and concentrations of LA that determine if a source exists at an individual property and if that source requires cleanup.

This Work Plan simply details how DEQ will collect sufficient and defensible information essential to support future cleanup decisions. That information includes conversations with property owners and other anecdotal information regarding historical use of vermiculite, VCI, and other LA containing materials, visual inspections, and sample results. Sampling decisions for the Troy OU are based on sampling protocols and sampling results from the work done in Libby. Cleanup decisions will be based on the presence of and the concentrations of LA.

- Visually determine if VCI is present or absent in attics of all buildings, if present determine if it is leaking into interior areas etc. to help guide collection of indoor dust samples from these areas to evaluate for the presence and concentrations of LA.
- If VCI is not visible in an attic, then collect dust samples from the living spaces to evaluate for the presence and concentrations of LA from any secondary indoor or outdoor source of LA.
- If vermiculite was used in building materials (plaster, concrete, or chinking), then collect building material samples to evaluate the presence and concentrations of LA from this potential secondary indoor source of LA.
- If vermiculite is visible in a building interior, then collect discrete samples to evaluate the presence and concentrations of LA in the area. In addition, collect dust samples from the other building levels or areas to evaluate the presence and concentrations of LA in those living spaces.
- If vermiculite is not visible in a building interior, then collect dust samples from the living spaces to evaluate the presence and concentrations of LA from any secondary indoor or outdoor source of LA.
- Visually determine if vermiculite or LA is present in exterior areas.
- Collect discrete soil samples from specific use areas to evaluate the presence and concentrations of LA.
- If the property contains a yard and large open space, then subdivide these areas by similar land uses (for example, grassed areas, driveways, parking areas, and front, back, and side yards) and collect a composite soil sample from each subarea to evaluate the presence and concentrations of LA.

Figure 3-1 shows the steps used to inspect and sample buildings and exterior property in the Troy OU. Figure 3-2 provides some typical outdoor soil sampling designs for specific use areas, yards, and open spaces.

TABLE 3-1 (continued)

DATA QUALITY OBJECTIVES
INVESTIGATION OF TROY PROPERTIES

STEP 6: Specify Tolerable Limits on Decision Errors

- Sampling and measurement error are associated with environmental data collection and may lead to decision errors. Sampling error occurs when the sample is not representative of the true site conditions. Measurement error occurs because of random and systematic errors associated with sample collection, handling, preparation, analysis, data reduction, and data handling. Decision errors are controlled by adopting a scientific approach that uses hypothesis testing to minimize the potential for error.
- There are two types of decision error: false negative error, and false positive error. A false negative decision error occurs when the null hypothesis is rejected although it is true. The consequences of a false negative error would be that VCI or LA-contaminated dust or soil at a Troy property is not identified for further evaluation and possible remediation. A false positive decision error occurs when the null hypothesis is not rejected although it is false. The consequences of a false positive error are that unnecessary resources are expended to evaluate media that is not truly contaminated or does a concern. ~~not pose undertake remedial action to address contaminated media that do not exist at concentrations that exceed action levels or acceptable risk levels.~~
- Property-specific sampling ~~objectives (unclear what is meant in this context??...is it resource limitations for achievable sampling designs ?), analytical limitations,~~ and the random distribution of vermiculite and LA-contaminant soil limit the usefulness of statistical methods to eliminate sampling error. ~~Therefore, sampling methods and procedures will be based on results from the Libby Asbestos Superfund Site.~~ Tolerable limits on sampling decision errors cannot be precisely defined; however, the decision errors will be minimized by inspecting and screening all properties in the Troy operable unit. Decision errors based on analytical data will be minimized by the use of standard EPA-approved and Libby-specific analytical methods and other pertinent information available from the Libby site.

STEP 7: Optimize the Sampling Design

- All properties in the Troy OU will be uniquely defined in the work plan, and their locations will be identified using existing Lincoln County records, cadastral databases, and low-level aerial photographs. The number of Troy properties to be investigated will be approximately 1,000.
- ~~Dust and soil samples will be collected using similar methods and standardized procedures that have been employed for the Libby Asbestos Superfund Site OU 4. With more than 4,000 Libby properties sampled since 2001, the methods have been defined (CDM 2002; CDM 2003a; CDM 2003b; EPA 2003a). Suggest incorporating the new procedures (2006) for exterior visual inspection, qualitative estimation of vermiculite concentrations, and soil sampling. Also, target sensitivity for indoor dust samples should be discussed with the Libby TAU.~~
- Field QA/QC procedures will be implemented and will include equipment and personnel decontamination, QA samples, field documentation, and sample chain of custody. Scientifically valid and legally defensible data will be supported by collection of dust and soil field blanks and other QA samples at a frequency necessary to assess potential cross contamination from equipment and sample integrity during collection.
- Field sample data sheets, similar to those used in Libby, will be completed for each sample collected and each property inspected within the Troy OU. The field data sheet information will be recorded

4.0 FIELD PROCEDURES

This section of the TAPE Work Plan describes the field activities to be implemented for the TAPE inspection and sampling project and includes the following tasks:

- Mobilizing and demobilizing
- Obtaining access agreements
- Scheduling inspections with property owners
- Conducting verbal interviews
- Conducting property inspections – indoor, attic, outbuildings, outdoor open spaces, yards, specific use areas (using the inspection field form [IFF]). **incorporate new outdoor visual inspection approach**
- Collecting indoor dust samples (recorded on dust sample field sampling data sheet [FSDS])
- Collecting building material samples (recorded on soil-like material sample FSDS)
- Collecting outdoor soil samples (recorded on soil-like material sample FSDS)
- Collecting QA/QC samples
- Decontaminating equipment and personnel
- Containing and disposing of investigation-derived waste

SOPs, with current amendments, are provided in Appendix B and are referenced throughout this section of the TAPE Work Plan. As appropriate, Tetra Tech has developed project-specific guidance for Troy which is based largely on guidance developed specifically for the Libby Asbestos Superfund Site. The Tetra Tech project-specific guidance and the Libby-specific procedures that were used to generate the Troy guidance documents are listed below with copies provided in Appendix B.

- | | |
|----------------|---|
| • Tetra Tech | TAPE FSDS and IFF Completion Guidance |
| • Tetra Tech | TAPE Soil Sampling Guidance |
| • CDM-Libby-05 | Site Specific Standard Operating Procedure for Soil Sample Collection |

Health and safety protocols and requirements will apply to all field activities and are summarized below. Information on quality control is provided in Sections 5.0 and 7.0 of this TAPE Work Plan.

Tetra Tech will not advise property owners of the likely nature of removals at their properties or estimated removal dates during the TAPE scheduling phase, the personal interviews, or the TAPE inspections and sampling. Property owners will be advised that DEQ and EPA will determine removals and schedules after analytical results have been received and evaluated.

Some Troy property owners may be non-responsive or unwilling to sign an access agreement, even when Tetra Tech has attempted to contact them by all reasonable means (telephone, visit to the property, and repeated mailings) to obtain permission for a TAPE inspection and sampling. Tetra Tech will provide DEQ with a list of all Troy properties where the property owner could not be contacted or unwilling to sign an access agreement at the conclusion of TAPE field activities.

4.3 VERBAL INTERVIEW

The Troy property visit by the TAPE field team will commence with a verbal interview by the field team with the property owner to acquire background information about the property. The field team will interview the property owner using the questions provided on the Interview for Residents/Employees form (Appendix E....I need to obtain the latest version of Appendix E for review and comment...some edits were recently suggested to the interview form during training on the Libby Database in December ?). Interview topics will include the known or suspected use of VCI or other LA-containing building materials in the house or outbuildings and possible introduction of other sources of LA within or near the property (including garden and landscaped areas and neighboring properties). A unique property identification number (AD-XXXXXX) will be assigned to each individual property that is inspected.

All buildings encountered during the TAPE inspections will be classified as a primary structure (habitable building, for example, a house, apartment, or main commercial space); or a secondary structure (non-habitable building, such as garages, shops, sheds, barns, or dog houses). The verbal interview will address all primary and secondary buildings and special use, open space, and yard areas located on a Troy property.

4.4 BUILDING INSPECTION, SAMPLE COLLECTION, AND RECORDING PROCEDURES

This section describes the inspection, sampling, and recording to be completed for each TAPE inspection.

location will be recorded at the primary entrance to each building. In addition, the building's primary entrance will be clearly marked on the building visible on the aerial photograph along with the corresponding building ID number (recorded directly on the building on the photograph. Coordinates will be saved on the GPS with a unique identification number that starts with the notation "BD-XXXXXX," where "BD" indicates a building location, and will also be recorded by the field team on the IFF, at the primary entrance to the building on the air photograph (for buildings shown), and in the field logbook.

4.4.2 Indoor Dust Sampling

Dust samples will be collected using microvacuum (microvac) sampling techniques in all primary buildings, regardless of whether VCI or other LA-containing building materials are observed. Asbestos is not visible to the unaided eye and not all sources (historical or current) may be identified through the verbal interview or during visual inspection, therefore, dust samples are collected at all properties. Dust samples will be collected following the procedures provided in American Society for Testing and Materials (ASTM) *Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations* (D 5755-95), as amended for the Libby Asbestos Superfund Site. A copy of this standard ASTM method is provided in Appendix B, with site-specific applications described below (ASTM 1995).

The decision to use microvac sampling, rather than wipe sampling, for the TAPE inspection and sampling was based primarily on the need to collect data that are consistent with data collected for the Libby Asbestos Superfund Site. EPA, and its contractor CDM, have used microvac sampling methods to collect the indoor dust samples in Libby. Microvac sampling methods are assumed to collect samples that more accurately measure releasable asbestos fibers when compared with wipe samples. Each indoor dust sample will be composed of a three-point composite sample (suggest increasing the number of dust collections for each sample (i.e., 15-point composite)...need to determine what is achievable, suggest discussing with the Libby TAU. Increased increments significantly improve the representativeness of the sample for the area-of-concern). as described in the above-mentioned ASTM standard (ASTM 1995), as amended.

4.4.2.1 Select Sampling Locations

The TAPE field team will select sample locations based on the team's visual inspection of the buildings and estimation of where contaminated dust is most likely to be found. The number and locations of dust samples will be selected as described below.

Primary and Secondary Buildings

Dust samples will be collected in every primary and secondary building regardless of whether LA contamination was observed during the visual inspection.

- Two dust samples will be collected on each level of the building's living space (including finished basements):
 - One three-point composite sample will be collected from accessible horizontal surfaces (for example, windowsill, shelving, and cabinets). The TAPE field team will select the surface or surfaces based on factors including proximity to observed VCI and dust accumulation. (Preference will be given to surfaces with higher dust accumulation that are closer to observed VCI.)
 - One three-point composite sample will be collected from high-traffic walkways, which will be selected by the TAPE field team based on the most probably walkway for tracking contamination into the building, including walkways adjacent to entry doors on the main floor. It will include main walkways and corridors between living areas on upper floors and in basements without walk-out access. Walkways may be solid surfaces or covered with rugs and carpets, or a combination. Samples will not be collected from temporary floor coverings that may be routinely cleaned or discarded.
- One three-point composite sample will be collected from each unfinished basement, if present. This sample will be collected from both walkways and horizontal surfaces inside the basement, with specific aliquots selected at the discretion of the TAPE field team.
- One three-point composite sample will be collected from each attached garage or shop, if present. This sample will be collected from both high-traffic walkways and horizontal surfaces inside the attached building, with specific aliquots selected at the discretion of the TAPE field team.
- No dust samples will be collected in attics or crawlspaces with visible LA contamination. Based on extensive sampling and analytical results from the Libby Asbestos Superfund Site, VCI found in attics and crawlspaces is assumed to be contaminated with LA fibers (EPA 2003b).
- The field team may choose to collect additional, targeted dust samples if migrating VCI or localized areas of contamination is observed in the living space of a primary structure. These data would be used to design small scale vermiculite removal actions if necessary.

included in the shipment because significant quantities of dust can remain in the nozzle. The sample will be labeled using the pre-printed sample labels and will be wrapped for return to the Tetra Tech field office. Dust samples will be labeled with a unique sample identification number "TT-XXXXX" where "TT" indicates a "Troy TAPE" sample. Chain-of-custody procedures will be followed as described in Section 5.5.2.

Indoor dust sample point locations will be described and recorded in the TAPE field logbook and on the FSDS and may be photographed and sketched on the property map at the discretion of the field team.

4.4.3 Building Materials Sample Collection

The TAPE field team may encounter some building materials (for example, chinking between log in log homes, special concrete with vermiculite added, and lathe and plaster walls) that include vermiculite. These special building materials, when encountered, will be sampled (with as little disturbance as possible to the building's finish) and information recorded in the logbook and on a soil-like materials FSDS. The building material samples will be labeled with a unique sample identification number "TT-XXXXX", where "TT" indicates a "Troy TAPE" sample.

Sampling of building materials will follow EPA guidance document 560/5-85-030A and ASTM Standard E2356-04 (see Appendix B), including the number of samples to be collected from each type of building material. The area to be sampled will be wetted down using surfactant-enhanced water prior to and during sampling to minimize potential asbestos fiber release. After sampling, the field team will use spray-on sealant and/or tape to encapsulate the material sampled if necessary.

As detailed in the HASP, decontamination zones will be established including areas around building material sampling activities. After personal and equipment decontamination are complete, decontamination areas will be cleaned of debris and residue using appropriate HEPA vacuuming or wet cleaning procedures. Visitors, including building occupants, will not be permitted to enter the decontamination zone without proper qualifications and authorization.

4.4.4 Outdoor Inspection (suggest incorporating updated Libby visual inspection and estimation of vermiculite levels into this section on evaluation of soils)

4.4.5 Outdoor Soil Sampling

After the visual inspection of the property has been conducted, the TAPE field team will collect soil samples from special use and yard areas following the procedures described below and in the Tetra Tech's project-specific guidance (Appendix B). Soil will be sampled regardless of the results of the visual inspection. Soil sampling will include the following steps:

- Identify sampling locations
- Collect samples
- Record locations on Troy property map
- Record sample locations using GPS

4.4.5.1 Identify Sampling Locations

TAPE soil samples will be collected as (suggest increasing to 20-30 point composites) five-point composites with composite subsamples taken from similar use areas. Typical designs for outdoor soil sampling are shown graphically on Figure 3-2. It can be assumed that LA sources would have been distributed across an area, for example by tilling into a yard or garden. A minimum of one five-point composite soil sample will be collected at each Troy property, unless the property has no soil-covered areas (for example, all outdoor areas are paved). A five-point composite will also be collected from the specific use areas; however, the size and dimensions of the specific use area may require that less than five subsamples be collected for some specific use areas. At least one five-point composite sample will be collected from the yard area. In general, five-point composite samples will not cover more than approximately 5,000 square feet. A maximum of five, five-point composite samples will be collected at each property, but additional composite or grab samples may be collected at the discretion of the TAPE field team. The TAPE field team will use professional judgment to select the appropriate numbers of soil samples to collect at each property. In addition, the TAPE field team will collect all soil samples with the minimum amount of disturbance to the surface. Sod will be carefully removed and immediately replaced after sampling and care will be taken to collect soil samples without disturbing growing flowers and vegetables. To ensure consistency, all TAPE field teams will be provided the same training and guidelines, and training will include "brainstorming" potential property scenarios and discussing proposed sampling approaches.

4.4.5.2 Collect Soil Samples

Soil samples will be collected from (1) outdoor yards and open spaces, and (2) specific use areas at properties in the Troy OU. Figure 3-2 provides typical outdoor soil sampling designs for these two types of outdoor areas.

A typical Troy yard sample will be composed of a five-point composite soil sample collected from the 0 to 1 inch depth. As shown in Figure 3-2, the five individual sample points that will make up each composite sample will be located within a similar land use area, such as the back yard, front yard, or side yard. A minimum of one five-point composite sample will be collected from each Troy OU property with a yard. Additional five-point composite samples will be collected when the yards are larger than 5,000 square feet.

A typical open space sample will also be composed of a five-point composite soil sample, as shown on Figure 3-2, collected from the 0 to 1 inch depth. Typical spacing for the individual five-point locations are shown as approximately 30 feet, but this distance can be modified to best fit the land use area. Additional five-point composite samples will be collected for each open space area of approximately 5,000 square feet. The Tetra Tech field team will use professional judgment to select the appropriate number and type of soil samples to collect for each yard and open space. Not all open spaces may be sampled, depending on current and historical uses. To ensure consistency, all field teams will be provided the same training and guidelines, and training will include “brainstorming” potential property scenarios and discussing proposed sampling approaches.

Specific use areas in Troy include outdoor gardens, former gardens, flower-beds, play areas, gravel or dirt driveways, and other areas with potentially greater exposure or greater use of vermiculite amendments. Five-point composite soil samples will be collected from the 0 to 6 inch depth interval in specific use areas. Figure 3-2 presents typical layouts for a garden plot, flower bed, and undefined areas. Typical sample spacing shown on Figure 3-2 is for 10 feet separation, but the distance can be modified to best fit the specific use area. The TAPE field teams will be provided training and guidelines for consistent sampling of specific use areas.

Disposable hand trowels will be used to collect approximately 500 grams of soil sample from the 0 to 1 inch or 0 to 6 inch soil interval at each subsample location for a total of approximately 2.5 kg of soil. If a small metal shovel is required to assist with sampling to 6 inches, the shovel will be thoroughly cleaned

5.0 FIELD QUALITY CONTROL PROCEDURES

Section 5.0 describes the methods and procedures for decontamination, quality assurance samples, field documentation, handling investigation-derived wastes, and maintaining chain of custody of samples and records.

5.1 EQUIPMENT AND PERSONNEL DECONTAMINATION

Dust samples will be collected using laboratory-provided filter cassettes with a new cassette and template for each sample collected. The air pump will not require decontamination between samples as a matter of course because of its position behind the sample filter during sample collection. If the exterior of the air pump becomes visibly dusty, it will be wiped clean with a damp paper towel to avoid transferring dust from one location to another.

Disposable scoops and individual sample collection bags will be used for soil and building material sampling; therefore decontamination of the equipment that is in touch with the soil is not necessary. If a small metal shovel is required to assist with sampling to 6 inches in hard, compacted soils, the shovel will be thoroughly cleaned and decontaminated after each sample using a spray bottle with distilled water and paper towels.

Visible soil on hands or clothing will be removed by washing with soap and water. Additional personnel decontamination procedures, including requirements for decontamination zones, are described in Section 9.2 of the HASP (Appendix A). PPE will include disposable gloves, disposable protective outerwear, work boots, and respirators. The respirators will be cleaned and decontaminated as discussed in the HASP (Appendix A).

(Suggest adding a section on "Sample Analysis" providing information on target analytical sensitivities, acceptance criteria, references concerning analyses etc.)

5.2 QUALITY ASSURANCE SAMPLES

Field blank dust samples will be collected at a frequency of one blank sample per 20 samples, or at 5 percent. Field blank dust samples will be collected at locations selected by the TAPE field team, and will be collected by attaching a cassette to the pump and pumping for 1 minute at the same rate as for dust

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